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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/912,595	07/26/2001	Masafumi Hashimoto	GNE441A	7183

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EXAMINER

DONG, DALEI

ART UNIT PAPER NUMBER

2875

DATE MAILED: 07/14/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/912,595

Applicant(s)

HASHIMOTO ET AL.

Examiner

Dalei Dong

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 17 June 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,2 and 4-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-2, and 4-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 July 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☒ Certified copies of the priority documents have been received in Application No. 09/912,595.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim to claims 1 and 10, the phrase "substantially" and "generally" renders the claim indefinite because it is unclear whether the limitations following the phrase are part of the claimed invention.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-2, 4, and 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,656,893 to Shino in view of U.S. Patent No. 5,821,685 to Peterson.

Regarding to claim 1-2, 4, and 7-9, Shino discloses in Figure 11b, "an AC-type PDP 200 includes a first glass substrate 203 and a second glass substrate 208 opposed to each other. The first glass substrate 203 and the second glass substrate 208 form an outer

casing of the AC-type PDP 200 together. On an inner face of the first glass substrate 203, a first electrode group including a plurality of comb-like scanning electrodes having teeth (first discharge electrode) 201 and a plurality of comb-like sustaining electrodes having teeth (second discharge electrodes) 202 is located. A dielectric layer 204 is located on the first glass substrate 203, covering the first electrode group, and a protection layer 205 is located on the dielectric layer 204. On an inner face of the second glass substrate 208, an second electrode group including a plurality of data electrode (third discharge electrode; also referred to as “address electrodes”) 207 is located. The data electrodes 207 are opposed to the protection layer 205 with discharge space 206 interposed therebetween” (column 17, line 59-67 to column 18, line 1-9).

Shino also discloses in Figure 11A, “the scanning electrodes 201a through 201n (only 201a and 201b are shown here) and the sustaining electrodes 202a through 202n (only 202a and 202b are shown here) are provided alternately. Adjacent scanning electrode and sustaining electrode (for example, 201a and 202a) are located opposed to each other with a small gap interposed therebetween so that teeth thereof are in engagement with each other” (column 18, line 10-17).

Shino further discloses in Figures 13A and 13B, “AC-type PDP 250, three types of phosphor layers R, G and B for emitting light of red, green and blue respectively are located on the inner face of the second glass substrate 208. The AC-type PDP 250 has the same structure as that of the AC-type PDP 200 except for the phosphor layers R, G and B. The phosphor layers R, G and B are respectively in substantial positional correspondence with three discharge areas S in one pixel area P (FIG. 13A) which is

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substantially square, and are excited to emit light upon receiving ultraviolet rays generated by discharge in the areas S" (column 20, line 11-21).

However, Shino does not disclose the phosphor layer continuously covers an entirety of the inner space overlying the linear parts of the first and second electrodes. Peterson teaches in Figure 5, "Face plate 60 is made from a transparent UV-transmitting material, such as glass. To lessen the scattering of light, face plate 60 can be made from a directional material such as a fiber optic. Within the interspace region, and on back plate 64, is disposed an electron source 66, which, in this embodiment, includes a cold cathode field emitter having a plurality of field emission devices 68. Disposed on the inner surface of face plate 60, are a plurality of anode conductors 62, which are made from a transparent, conductive material and are deposited on face plate 60 by any of a number of deposition techniques known in the art. A layer 72 of electron-excitable UV-emitting material is disposed on anode conductors 62. This configuration allows layer 72 to function also as a thermal heat sink with face plate 60. FEDs are driven at current densities which generate appreciable heat within their phosphors; low heat dissipation out of the phosphor can have adverse effects on phosphor performance. Thus, this configuration is beneficial since it enhances the conduction of heat away from layer 72. Layer 72 is formed by sol-gel techniques and liquid film deposition methods, as described with reference to FIG. 4 and the description of layer 52. In this embodiment of a FED in accordance with the present invention, layer 72 is spaced from a layer 70, which includes a UV-excitable light-emitting phosphor. A list of such phosphors is set forth with reference to FIG. 1, in the description of light-emitting particles 10. In other

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embodiments, layer 70 is fabricated via sol-gel techniques. Layer 70 is formed on the outer surface of face plate 60 and is enclosed by a protective film 74, such as a silica barrier layer, which protects the light-emitting phosphor from exposure to moisture in the air. In this particular embodiment, layer 72 includes  $\text{ZnO.Ga.sub.2 O.sub.3 :Gd}$  formed by sol-gel techniques as described with reference to FIG. 2 and deposited as a film by any of several liquid film deposition techniques, such as spin-casting, dipping, vapor phase deposition, and the like. In this embodiment, electrons emitted by electron source 66 are received by layer 72 which is thereby excited to emit UV radiation, which, in turn, travels through transparent anode conductors 62 and transparent face plate 60 to be received by layer 70 which is thereby excited to emit visible light having a predetermined color. A sol-gel layer, such as layer 72 of FED 400, also provides improved mechanical ruggedness over prior art powdered phosphors which are adhered to the inner surface of a face plate of a display. This improved mechanical stability is desirable when mechanical standoff structures, or spacers, are incorporated between the face plate and back plate of a display, so that minor mechanical disturbances during the placement and fixation of such spacers do not remove, or otherwise adversely affect the patterning of, the phosphor. Because layer 70 is disposed on the outer surface of face plate 60, the UV-excitabile light-emitting phosphor can be deposited subsequent to the high-temperature, packaging steps included in the fabrication of FED 400, so that UV-excitabile light-emitting phosphors having low temperature tolerances are employable. The configuration also allows the use of organic UV-excitabile light-emitting phosphors in layer 70.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have apply the sol-gel phosphor layer to continuously covers an entirety of the inner space of the front substrate of Shino in order to function as a thermal heat sink to enhance the conduction of heat away from the phosphor layer and further improves mechanical ruggedness and thus prolong the lifetime of the plasma display

5. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,656,893 to Shino in view of U.S. Patent No. 5,821,685 to Peterson in further view of U.S. Patent No. 5,801,483 to Watanabe.

Regarding to claim 5, Shino discloses a flat-type light-emitting device comprising an envelope, a phosphor layer, first and second electrode including linear parts and finally the envelope allows the visible light to penetrate through the envelope to the outside.

However, Shino does not disclose the phosphor layer continuously covers an entirety of the inner space overlying the linear parts of the first and second electrodes and a photocatalyst layer formed on an outer surface of the envelope. Peterson teaches the phosphor layer continuously covers an entirety of the inner space overlying the linear parts of the first and second electrodes; however, fails to teach a photocatalyst layer formed on an outer surface of the envelope.

Watanabe teaches "international laid open patent application No. WO 94/11092 and Japanese laid open patent application No. 7-11104 disclose an air treating method using a photocatalyst under interior illumination. According to those applications, the

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photo catalytic material is excited by ultraviolet radiation from a conventional fluorescent lamp" (column 1, line 45-50).

It would have been obvious to one of ordinary skills in the art at the time the invention was made to utilize the photocatalyst material of Watanabe on the outer surface of the envelope of Shino and the phosphor layer of Peterson continuously covers an entirety of the inner space overlying the linear parts of the first and second electrodes on the top substrate of Shino in order to have an even or uniform distribution of the light intensity without luminance degradation and provide stable discharge paths between all the adjoining linear parts of electrodes in the inner space of the envelope.

6. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,656,893 to Shino in view of U.S. Patent No. 5,821,685 to Peterson in further view of U.S. Patent No. 5,185,554 to Nomura.

Regarding to claim 6, Shino discloses a flat-type light-emitting device comprising an envelope, a phosphor layer, first and second electrode including linear parts and finally the envelope allows the visible light to penetrate through the envelope to the outside.

However, Shino does not disclose the phosphor layer continuously covers an entirety of the inner space overlying the linear parts of the first and second electrodes and the relationship of the distance between electrodes and the vertical distance of the envelope. Peterson teaches the phosphor layer continuously covers an entirety of the inner space overlying the linear parts of the first and second electrodes; however, fails to



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teach the relationship of the distance between electrodes and the vertical distances of the envelope.

Nomura teaches “for the modulating electrode in the present embodiment, a nickel material is used and a group of modulating electrodes are prepared with a width of 106 mm and a pitch of 2 mm each” (column 7, line 21-24).

Nomura also teaches “a face plate (like the face plate 10 as shown in Figure 11) having a fluorescent member (an image forming member) is provided at 5 mm distance from the rear plate of the electron-beam generator prepared according to the process described above” (column 8, line 8-13).

It is old and well known in the art of Paschen’s Law whose relates the voltage at which a gas breaks down into a plasma, the so called spark or firing voltage, to the product of the pressure of the gas,  $p$  (in mm Hg), times the distance,  $d$  (in cm), between the electrode.

It would have been obvious to one of ordinary skills in the art at the time the invention was made to utilize the electrode configuration and the separation of the two face plates of Nomura for the light-emitting device of Shino and add the phosphor layer of Peterson continuously covers an entirety of the inner space overlying the linear parts of the first and second electrodes on the top substrate of Shino; further the electrode configuration can be revised according to the Paschen’s Law with the desired design choice in order to have an even or uniform distribution of the light intensity without luminance degradation and provide stable discharge paths between all the adjoining linear parts of electrodes in the inner space of the envelope.

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7. Claims 10, 12 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,656,893 to Shino in view of U.S. Patent No. 5,821,685 to Peterson in further view of U.S. Patent No. 5,508,584 to Tsai.

Regarding to claims 10, 12 and 15 Shino discloses a flat-type light-emitting device comprising an envelope, a phosphor layer, first and second electrode including linear parts and finally the envelope allows the visible light to penetrate through the envelope to the outside.

However, Shino fails to disclose the phosphor layer continuously covers an entirety of the inner space overlying the linear parts of the first and second electrodes and the first and second electrodes having linearly extended first and second connection parts and plural first and second fingers. Peterson teaches the phosphor layer continuously covers an entirety of the inner space overlying the linear parts of the first and second electrodes; however, fails to teach the first and second electrodes having linearly extended first and second connection parts and plural first and second fingers.

Tsai teaches in Figure 7, "three conductive lines 82, 83 and 84. Conductive lines 82 and 84 have a comb-like shape while line 83 has an interweaving shape, wherein all three lines are interlocking as shown schematically in Figure 7. These lines are formed to a width of between about 30 and 100 micrometers" (column 6, line 1-5).

It would have been obvious to one of ordinary skills in the art at the time the invention was made to utilize the detailed layout of electrodes of Tsai for the light-emitting device of Shino and have the phosphor layer of Peterson continuously covers an entirety of the inner space overlying the linear parts of the first and second electrodes on

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top substrate of Shino in order to decrease spot size, increase throughput and reduce power consumption and further improve focus in all directions.

8. Claims 11, 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,656,893 to Shino in view of U.S. Patent No. 5,821,685 to Peterson in further view of U.S. Patent No. 5,508,584 to Tsai yet in further view of U.S. Patent No. 5,185,554 to Nomura.

Regarding to claim 6, Shino discloses a flat-type light-emitting device comprising an envelope, a phosphor layer, first and second electrode including linear parts and finally the envelope allows the visible light to penetrate through the envelope to the outside.

However, Shino does not disclose the phosphor layer continuously covers an entirety of the inner space overlying the linear parts of the first and second electrodes and the first and second electrodes having linearly extended first and second connection parts and plural first and second fingers and the relationship of the distance between electrodes and the vertical distance of the envelope. Peterson teaches the phosphor layer continuously covers an entirety of the inner space overlying the linear parts of the first and second electrodes; however, fails to teach the first and second electrodes having linearly extended first and second connection parts and plural first and second fingers and the relationship of the distance between electrodes and the vertical distance of the envelope.

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Tsai teaches first and second electrodes having linearly extended first and second connection parts and plural first and second fingers, however, Tsai does not teach the distance between electrodes and the vertical distance of the envelope.

Nomura teaches “for the modulating electrode in the present embodiment, a nickel material is used and a group of modulating electrodes are prepared with a width of 106 mm and a pitch of 2 mm each” (column 7, line 21-24).

Nomura also teaches “a face plate (like the face plate 10 as shown in Figure 11) having a fluorescent member (an image forming member) is provided at 5 mm distance from the rear plate of the electron-beam generator prepared according to the process described above” (column 8, line 8-13).

It is old and well known in the art of Paschen’s Law whose relates the voltage at which a gas breaks down into a plasma, the so called spark or firing voltage, to the product of the pressure of the gas,  $p$  (in mm Hg), times the distance,  $d$  (in cm), between the electrode.

It would have been obvious to one of ordinary skills in the art at the time the invention was made to utilize the electrode configuration of Tsai with the separation of the two face plates of Nomura for the light-emitting device of Shino and add the phosphor layer of Peterson continuously covers an entirety of the inner space overlying the linear parts of the first and second electrodes on the top substrate of Shino; further the electrode configuration can be revised according to the Paschen’s Law with the desired design choice in order to have an even or uniform distribution of the light intensity

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without luminance degradation and provide stable discharge paths between all the adjoining linear parts of electrodes in the inner space of the envelope.

### ***Conclusion***

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following prior art are cited to further show the state of the art of composition of a flat-type light-emitting device.

U.S. Patent No. 4,638,218 to Shinoda.

U.S. Patent No. 6,097,146 to Yoshimura.

U.S. Patent No. 6,356,030 to Itoh.

U.S. Patent No. 6,380,669 to Zachau.

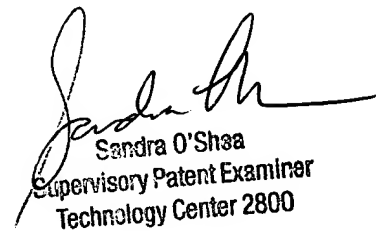
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dalei Dong whose telephone number is (703)308-2870. The examiner can normally be reached on 8 A.M. to 5 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sandra O'Shea can be reached on (703)305-4939. The fax phone numbers for the organization where this application or proceeding is assigned are (703)872-9318 for regular communications and (703)872-9319 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

D.D.  
July 1, 2003



Sandra O'Shea  
Supervisory Patent Examiner  
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